

REMARKS

Claims 1–26 and 28-78 are currently pending in the Application. Claims 1-38 and 74-78 were previously elected for prosecution without traverse. Claims 39-73 were previously withdrawn from consideration. Claim 27 has been cancelled without prejudice or disclaimer.

Claims 1, 7-9, 19-23, 26, 28-29, 36-38 and 74 have been amended. Specifically, claims 1, 7-9, 22-23 and 74 have been amended to indicate that carbon nanotubes are sorted by electronic type in accordance with various methods. Support for these amendments can be found at least in Paragraphs 5, 10, 43, 49-53 and FIG. 4 of the Application.

Likewise, claims 19-21, 36 and 38 have been amended to more clearly define the methods and growth environments for growing carbon nanotube seeds. Support for these amendments can be found at least in Paragraphs 66, 78-83 and FIG. 7 of the Application.

In addition, claim 26 has been amended to provide support for how single-wall carbon nanotubes may be used for hydrogen storage in various embodiments. Support for this amendment can be found at least in Paragraph 82 of the Application. The aforementioned claims have also been amended for stylistic purposes.

Figure 6 and Paragraph 2 of the Application have also been amended for stylistic purposes. These amendments do not add any new matter. Applicants hereby address the Examiner's remarks in the order that they appeared in the Office Action.

I- Information Disclosure Statement

Applicants hereby acknowledge the Examiner's remarks that "[t]he listing of references in the specification is not a proper information disclosure statement." Office Action, page 2. Accordingly, Applicants will cite any relevant references in the specification in an information disclosure statement in due course.

II- Objection to Drawings

Replacement Sheet 6/8 addresses the Examiner's objections to Figure 6. Specifically, Replacement Sheet 6/8 contains an amended version of Figure 6 that identifies the corresponding drawing as "Prior Art."

III- Rejections Under 35 U.S.C. § 101

The Examiner's rejections of claims 8 and 26-27 under 35 U.S.C. §101 for allegedly lacking "any steps involved in the process" are considered moot. Specifically, the rejection of claim 27 is considered moot in view of the cancellation of that claim. Furthermore, amendments to claims 8 and 26 provide the requisite "steps involved in the process."

IV- Rejections Under 35 U.S.C. § 112

In the Office Action, the Examiner rejected claims 8, 19-38 and 76-78 under 35 U.S.C. § 112 (second paragraph) for allegedly being indefinite. Office Action, pages 4-6. Applicants respectfully submit that the above-mentioned amendments to claims 8, 19-23, 26, 28-29, 36-38 and 74 render the rejections moot. Therefore, Applicants respectfully request the withdrawal of those rejections.

V- Rejections Under 35 U.S.C. § 102(b)

In the Office Action, the Examiner rejected claims 1-3, 6-10, 13, 17-18, 20, 22, 19, 21-25, 31, 34-38, 29 and 76-78 under 35 U.S.C. § 102(b) for allegedly being anticipated by U.S. Pat. App. Pub. No. 2002/0004028 to Margrave et al. (hereinafter "Margrave"). Office Action, pages 6-8. For the reasons set forth below, Applicants respectfully traverse these rejections.

For a claim to be anticipated under 35 U.S.C. §102(b), each and every claim limitation must be found within the cited prior art reference and arranged as required by the claim. M.P.E.P. §2131 (emphasis added). Furthermore, "there must be *no difference* between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention." *Scripps Clinic & Research Found. v. Genentech, Inc.*, 927 F.2d 1565, 1576 (Fed. Cir. 1991) (emphasis added). Accordingly, any difference between the claimed invention and the prior art defeats a claim of anticipation. *E.I. du Pont de Nemours & Co. v. Polaroid Graphics Imaging, Inc.*, 706 F.Supp. 1135, 1142 (D.Del. 1989) (emphasis added).

Based on the aforementioned standard, Margrave is not an anticipatory prior art reference because it does not contain each and every element of the claimed invention as described in the rejected claims. For instance, Margrave does not disclose any methods for "sorting...carbon nanotubes by electronic type", as currently required for the rejected claims. In fact Applicants are unaware of any disclosed methods in Margrave that even relate to sorting carbon nanotubes

by “electronic type.” Rather, as the Examiner admits, any reference in Margrave to the sorting of carbon nanotubes pertains to selecting carbon nanotube “segments of a specific *range of length*”, not of a specific “electronic type”, as currently required for the rejected claims. *See*, e.g., Margrave, Paragraph 169 (emphasis added). *Also see* Office Action, page 7.

With respect to rejected claims 7-9, Applicants further submit that Margrave is also entirely silent on the disclosure of any methods for sorting carbon nanotubes by “electronic type” through “selective chemical derivatization”, “selective extraction”, “selective precipitation”, “selective chemical functionalization”, “selective protonation”, or “superacid extraction”, as currently required for those claims. Applicants are also unaware of any relevant disclosures in Margrave that pertain to the aforementioned methods.

V- Rejections Under 35 U.S.C. § 103(a)

In the Office Action, the Examiner rejected claims 1-3, 6-10, 13, 17-18, 20, 22, 19, 21-25, 31, 34-35, 29, 36, 38 and 76-78 under 35 U.S.C. § 103(a) as allegedly being obvious over Margrave. Office Action, page 10. In addition, the Examiner rejected claims 4 and 16 under 35 U.S.C. § 103(a) as allegedly being obvious over Margrave in view of U.S. Pat. No. 6,413,487 to Resasco et al. (hereinafter “Resasco”). Office Action, pages 10-11. In addition, the Examiner rejected claims 5 and 30 under 35 U.S.C. § 103(a) as allegedly being obvious over Margrave in view of a Nano Letters reference by Gu et al. entitled “Cutting Single-Wall Carbon Nanotubes through Fluorination” (2002, 2(9):1009-1013, hereinafter “Gu”). Office Action, page 11. In addition, the Examiner rejected claims 11-12, 14-15, 32-34 and 74-75 under 35 U.S.C. § 103(a) as allegedly being obvious over Margrave in view of a Journal of American Chemical Society article by An et al. entitled “Synthesis of Nearly Uniform Single-walled Carbon Nanotubes Using Identical Metal-Containing Molecular Nanoclusters as Catalysts” (2002, 124(46):13688-13689, hereinafter “An”). Office Action, pages 11-12. The Examiner also rejected claims 26-27 under 35 U.S.C. § 103(a) as allegedly being obvious over Margrave in view of an Applied Physics article by Dillon et al. entitled “Hydrogen storage using carbon adsorbents: past, present and future” (2001, 72:133-142, hereinafter “Dillon”). For the reasons set forth below, Applicants respectfully traverse these rejections.

For rejections to be proper under 35 U.S.C. § 103(a), all claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 985 (C.C.P.A. 1974). In addition, a

reasonable expectation of success for the claimed invention must be founded in the prior art. *See* M.P.E.P. §2143.02 (citing *In re Rinehart*, 531 F.2d 1048 (CCPA 1976). *Also see In re Dow Chem. Co.*, 837 F.2d 469, 473 (Fed. Cir. 1988) (stating that “[b]oth the suggestion and the expectation of success must be founded in the prior art, not in applicant’s disclosure.”)

Furthermore, the Examiner must provide an explanation as to why any differences between the prior art and the claimed invention would have been obvious to one of ordinary skill in the art. M.P.E.P. §2141; *KSR Intern. Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (U.S., 2007) (“[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”, quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

In addition, the Examiner may not rely on hindsight bias without considering the claimed invention and the prior art as a whole in accordance with the requisite *Graham* factual inquiries. M.P.E.P. §2141; *Ruiz v. A.B. Chance Co.* 69 U.S.P.Q.2d 1686, 1690 (Fed. Cir. 2004) (stating that “Section 103 precludes...hindsight discounting of the value of new combinations by requiring assessment of the invention *as a whole*...by requiring a showing that an artisan of ordinary skill in the art *at the time of invention*, confronted by the *same problems* as the inventor and with *no knowledge of the claimed invention*, would select the various elements from the prior art and combine them in the claimed manner.”) (emphasis added).

However, when one compares the limitations of the rejected claim and the cited references as a whole, significant differences become apparent. Such differences indicate that a person of ordinary skill in the art at the time of the present invention would not have combined or modified the various elements from Margrave, Resasco, Gu, An and Dillon in the claimed manner with a reasonable expectation of success.

For instance, even when combined, Margrave, Resasco, Gu, An and Dillon do not teach or suggest all the limitations of the rejected claims. As set forth previously, Margrave does not teach or suggest any methods for “sorting...carbon nanotubes by electronic type”, as currently required for the rejected claims. With respect to rejected claims 7-9, Margrave also does not teach or suggest any methods for sorting carbon nanotubes by electronic type through “selective chemical derivatization”, “selective extraction”, “selective precipitation”, “selective chemical functionalization”, “selective protonation”, or “superacid extraction”, as currently required for those claims.

In fact, there is no indication that the methods disclosed in Margrave would even be suitable for sorting carbon nanotubes by electronic type. This is not surprising because the invention in Margrave utilized chemical derivatization of carbon nanotubes in order to increase their solubility, not to sort them by electronic type. *See, e.g.*, Abstract and Title.

Furthermore, Resasco, Gu, An and Dillon do not cure the aforementioned defects in Margrave. For instance, Resasco discloses methods and apparatus for catalytic production of carbon nanotubes. *See, e.g.*, Abstract. Yet, the disclosed methods and apparatus in Resasco do not teach or suggest any methods for “sorting...carbon nanotubes by electronic type”, as currently required for the rejected claims. In fact, Applicants are unaware of any disclosure in Resasco that even pertains to the sorting of the catalytically produced carbon nanotubes.

The disclosure in Gu is also defective with respect to the claimed invention. For instance, rather than disclosing methods for “sorting...carbon nanotubes by electronic type”, Gu focuses exclusively on methods of “**Cutting** Single-Wall Carbon Nanotubes through Fluorination.” *See, e.g.*, Title and Abstract (emphasis added).

An also does not cure the aforementioned defects in Gu, Resasco and Margrave. In particular, An focuses on a specific method of synthesizing uniform single-walled carbon nanotubes by utilizing metal-containing molecular nanoclusters as catalysts. *See, e.g.*, Title and page 13689 (col. 2). However, An remains entirely silent on any methods of sorting the synthesized carbon nanotubes, including “sorting...carbon nanotubes by electronic type.”

Finally, the disclosure in Dillon also does not cure the aforementioned defects in An, Gu, Resasco and Margrave. As the Examiner admits, the disclosure in Dillon pertains to a summary of hydrogen storage methods that utilize carbon adsorbents. *See, e.g.*, Abstract of Dillon. *Also see* Office Action, pages 12-13. Therefore, and not surprisingly, Dillon also remains entirely silent on any methods of sorting carbon nanotubes, including “sorting...carbon nanotubes by electronic type.”

CONCLUSION

For at least the reasons stated above, Applicants assert that claims 1-26, 28-38 and 74-78 are in condition for allowance. Accordingly, Applicants respectfully request an allowance of the aforementioned claims. Applicants also request that the Examiner call Applicants' Attorney at the below listed number if the Examiner believes that such a discussion would be helpful in resolving any remaining issues.

DATED: April 13, 2011

Respectfully submitted,

WINSTEAD P.C.

Attorney for Applicants

By: /Farhang Amini/
Farhang Amini, Ph.D.
Reg. No. 59,412

P.O. Box 50784
Dallas, Texas 75270-2199
Tel: (713) 650-2795
Fax: (214) 745-5390